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Filed : November 8, 1999

AMENDMENTS TO THE CLAIMS

1-37. (Cancelled).

B1 Subj
38. (Currently Amended) ~~An occlusion device~~ ~~A containment device, for occluding a hollow body structure,~~ comprising:

a proximal end, a distal end, and a longitudinal axis extending therethrough;
at least three supports extending between the proximal end and the distal end;
each support comprising an elongate, flexible element which is movable from a first orientation in which the element extends substantially parallel to the axis at no more than a first distance from the axis, to a second orientation in which at least a portion of the element is inclined with respect to the axis and is separated by at least a second distance from the axis which is greater than the first distance; and
an endothelialization membrane carried by the device, for promoting endothelialization across ~~(the hollow body structure.)~~

wherein the endothelialization membrane at least in part comprises a first membrane on a first side of the supports, a second membrane on a second side of the supports, and a bonding layer for bonding the first membrane and the second layer membrane together.

39. (Currently Amended) ~~An occlusion device~~ ~~A containment device~~ as in Claim 38, comprising at least five supports.

40. (Currently Amended) A containment device ~~An occlusion device~~ as in Claim 38, comprising from about five supports to about twenty supports.

41. (Currently Amended) A containment device ~~An occlusion device~~ as in Claim 38, further comprising a proximal hub at the proximal end and a distal hub at the distal end.

42. (Currently Amended) A containment device ~~An occlusion device~~ as in Claim 41, wherein the supports and the proximal hub and the distal hub are formed from a tube.

43. (Currently Amended) A containment device ~~An occlusion device~~ as in Claim 41, wherein the supports and the proximal hub and the distal hub are formed from a sheet.

44. (Currently Amended) A containment device ~~An occlusion device~~ as in Claim 38, further comprising at least one barb on each support.

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45. (Currently Amended) A containment device ~~An occlusion device~~ as in Claim 40, further comprising at least one barb on each of at least two supports.

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46-50. (Cancelled).

51. (Currently Amended) A containment device ~~An embolic occlusion device~~, for implantation within a tubular structure in the body, comprising:

a support member comprising at least three spokes which are movable from a reduced cross-section to an enlarged cross-section, the spokes movable from an axial orientation when the occluding member is in the reduced cross-section to an inclined orientation when the occluding member is in the enlarged cross-section, and

a porous endothelialization membrane carried by the support,
wherein the endothelialization membrane at least in part comprises a first membrane on a first side of the device, a second membrane on a second side of the device, and a bonding layer for bonding the first membrane and the second membrane together.

52. (Currently Amended) A containment device ~~An embolic occlusion device~~ as in Claim 51, further comprising at least one hub on the support for holding the spokes.

53. (Currently Amended) A containment device ~~An embolic occlusion device~~ as in Claim 51, wherein the support comprises at least eight spokes.

54. (Currently Amended) A containment device ~~An embolic occlusion device~~ as in Claim 52, wherein at least one spoke has a first end and a second end, and the first end is attached to the hub.

55. (Currently Amended) A containment device ~~An embolic occlusion device~~ as in Claim 51, wherein each spoke comprises a proximal section, a distal section, and a bend between the proximal and distal sections when the support is in the enlarged cross-section.

56. (Currently Amended) A containment device ~~An embolic occlusion device~~ as in Claim 51, wherein the spokes comprise wire.

57. (Currently Amended) A containment device ~~An embolic occlusion device~~ as in Claim 51, wherein the spokes are cut from a tube.

58. (Currently Amended) A containment device ~~An embolic occlusion device~~ as in Claim 51, further comprising at least one tissue attachment element on the support.

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59. (Currently Amended) A containment device An embolic occlusion device as in Claim 58, wherein the tissue attachment structure comprises a tissue piercing element.

60. (Currently Amended) A containment device An embolic occlusion device as in Claim 59, comprising at least one barb on each spoke.

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61. (Currently Amended) A containment device An occlusion device as in Claim 38, wherein the supports comprises a nickel titanium alloy.

62. (Currently Amended) A containment device An occlusion device as in Claim 38, wherein the supports comprises stainless steel.

63. (Currently Amended) A containment device An occlusion device as in Claim 38, wherein the first and second membranes comprises ePTFE.

64. (Currently Amended) A containment device An occlusion device as in Claim 38, wherein the first and second membranes comprises Dacron.

65. (Currently Amended) A containment device An occlusion device as in Claim 38, where the first and second membranes comprises nylon.

66. (Currently Amended) A containment device An occlusion device as in Claim 38, wherein the endothelialization membrane has a pore size of no greater than about 0.04 inches.

67. (Currently Amended) A containment device An occlusion device as in Claim 38, wherein the occlusion containment device comprises a self expandable structure.

68. (Currently Amended) A containment device An occlusion device as in Claim 38, wherein the occlusion containment device comprises a self expandable wire structure.

69. (Currently Amended) A containment device An occlusion device as in Claim 67, wherein the self expandable structure comprises wire mesh.

70. (Currently Amended) A containment device An occlusion device as in Claim 67, wherein the self expandable structure comprises braided wire.

71. (Currently Amended) A containment device An occlusion device as in Claim 67, wherein the self expandable structure comprises wire coil.

72. (Currently Amended) A containment device An occlusion device as in Claim 67, wherein the self expandable structure comprises shape memory material.

73. (Currently Amended) A containment device An occlusion device as in Claim 67, wherein the self expandable structure comprises pseudoelastic alloy.

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74. (Currently Amended) A containment device An occlusion device as in Claim 67, wherein the self expandable structure comprises nickel titanium alloy.

75. (Currently Amended) A containment device An occlusion device as in Claim 67, wherein the self expandable structure comprises stainless steel.

76. (Currently Amended) A containment device An occlusion device as in Claim 67, wherein the self expandable structure comprises composite material.

77. (Currently Amended) A containment device An embolic occlusion device as in Claim 54, further comprising at least one tissue attachment element on the support.

78. (Currently Amended) A containment device An embolic occlusion device as in Claim 54, wherein (the supports) comprises a nickel titanium alloy.

79. (Currently Amended) A containment device An embolic occlusion device as in Claim 54, wherein (the supports) comprises stainless steel.

80. (Currently Amended) A containment device An embolic occlusion device as in Claim 54, wherein the first and second membranes comprises ePTFE.

81. (Currently Amended) A containment device An embolic occlusion device as in Claim 54, wherein the first and second membranes comprises Dacron.

82. (Currently Amended) A containment device An embolic occlusion device as in Claim 54, where the first and second membranes comprises nylon.

83. (Currently Amended) A containment device An embolic occlusion device as in Claim 5451, wherein the endothelialization membrane has a pore size of no greater than about 0.04 inches.

84. (Currently Amended) A containment device An embolic occlusion device as in Claim 5451, wherein the occlusion containment device comprises a self expandable structure.

85. (Currently Amended) A containment device An embolic occlusion device as in Claim 84, wherein the occlusion containment device comprises a self expandable wire structure.

86. (Currently Amended) A containment device An embolic occlusion device as in Claim 84, wherein the self expandable structure comprises wire mesh.

87. (Currently Amended) A containment device An embolic occlusion device as in Claim 84, wherein the self expandable structure comprises braided wire.

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88. (Currently Amended) A containment device ~~An embolic occlusion device~~ as in Claim 84, wherein the self expandable structure comprises wire coil.

89. (Currently Amended) A containment device ~~An embolic occlusion device~~ as in Claim 84, wherein the self expandable structure comprises shape memory material.

90. (Currently Amended) A containment device ~~An embolic occlusion device~~ as in Claim 84, wherein the self expandable structure comprises pseudoelastic alloy.

91. (Currently Amended) A containment device ~~An embolic occlusion device~~ as in Claim 84, wherein the self expandable structure comprises nickel titanium alloy.

92. (Currently Amended) A containment device ~~An embolic occlusion device~~ as in Claim 84, wherein the self expandable structure comprises stainless steel.

93. (Currently Amended) A containment device ~~An embolic occlusion device~~ as in Claim 84, wherein the self expandable structure comprises composite material.

94. (Currently Amended) A containment device ~~An embolic occlusion device~~ as in Claim 84, wherein the self expandable structure has at least one proximally concave surface and at least one distally concave surface when in an expanded configuration.

95. (Currently Amended) A containment device ~~An embolic occlusion device~~ as in Claim 9451, wherein the membrane bonding layer comprises a mesh.

96. (Currently Amended) A containment device ~~An embolic occlusion device~~ as in Claim 95, wherein the mesh comprises polyethylene.

97. (Currently Amended) A containment device ~~An embolic occlusion device~~ as in Claim 96, wherein the mesh has an open surface area within the range of from about 10% to about 90%.

98. (Currently Amended) A containment device ~~An embolic occlusion device~~ as in Claim 96, wherein the mesh has an open surface area within the range of from about 30% to about 60%.

99-100. (Cancelled)

101. (New) A device for implantation within a left atrial appendage of a patient, the device comprising:

a proximal end, a distal end, and a longitudinal axis extending therethrough;
at least three supports extending between the proximal end and the distal end;

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each support comprising an elongate, flexible element which is movable from a first orientation in which the element extends substantially parallel to the axis at no more than a first distance from the axis, to a second orientation in which at least a portion of the element is inclined with respect to the axis and is separated by at least a second distance from the axis which is greater than the first distance; and

an endothelialization membrane attached to at least a proximal face of the device having a pore size sufficient to permit endothelialization.

102. (New) The device of Claim 101, wherein the endothelialization membrane has a porosity in the range of about 5 to about 60 microns.

103. (New) The device of Claim 101, wherein the endothelialization membrane has a porosity in the range of about 10 to about 100 microns.

104. (New) The device of Claim 101, wherein the endothelialization membrane has a porosity in the range of up to about 0.04 inches.

105. (New) The device of Claim 101, wherein the endothelialization membrane has a porosity of up to about 0.005 inches.

106. (New) The device of Claim 101, wherein the endothelialization membrane comprises a first membrane and a second membrane, wherein the first membrane and second membrane are attached to each other on opposite sides of the supports.

107. (New) The device of Claim 101, further comprising a proximal hub at the proximal end and a distal hub at the distal end.

108. (New) The device of Claim 101, wherein the supports comprise a nickel titanium alloy.

109. (New) The device of Claim 101, wherein the membrane comprises ePTFE.

110. (New) A method of preventing atrial appendage thrombus from entering the blood stream comprising:

securing a membrane over an ostium of the atrial appendage by extending prongs from adjacent an edge of the membrane into the atrial appendage through the ostium; and

piercing the wall of the atrial appendage with the prongs extending into the atrial appendage wall substantially adjacent the ostium to secure the membrane in place; thereby:

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blocking the atrial appendage ostium with the membrane preventing blood from entering the atrial appendage and forming thrombus therein and preventing thrombus formed therein from leaving.

111. (New) A method of preventing atrial appendage thrombus from entering the blood stream as in claim 110 further comprising:

centering the membrane over the ostium by attaching the prongs adjacent the edge of the membrane substantially in a circle such that the prongs will position the membrane over the ostium without leaving gaps between the ostium and the membrane.

112. (New) A method of preventing atrial appendage thrombus from entering the blood stream as in claim 110 further comprising:

extending a stent between the membrane and the prongs to engage the ostium of the atrial appendage for securing the membrane to the ostium. *not available*

113. (New) A method of preventing atrial appendage thrombus from entering the blood stream as in claim 110 further comprising:

securing the membrane over the ostium of the atrial appendage by extending stent legs into the atrial appendage through the ostium of the atrial appendage to hold the membrane snugly against the ostium of the atrial appendage.

114. (New) A method of preventing atrial appendage thrombus from entering the blood stream as in claim 110 further comprising:

attaching the membrane to the ostium of the atrial appendage by extending a collapsible stent into the ostium such that the stent expands and engages the circumference of the ostium and attaching a collapsible membrane across the lumen of the stent such that opening the stent stretches the membrane across the lumen of the stent thus blocking the ostium.

115. (New) A method of preventing atrial appendage thrombus from entering the blood stream as in claim 110 further comprising:

coating the membrane with an anticoagulant drug to prevent thrombosis.

116. (New) A method of preventing atrial appendage thrombus from entering the blood stream as in claim 110 further comprising:

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providing a porous membrane for encouraging endothelial cells to grow in the membrane thus providing a cell wall over the membrane to prevent thrombosis.

117. (New) A method of preventing atrial appendage thrombus from entering the blood stream as in claim 110 further comprising:

injecting a blood coagulating substance into the atrial appendage to clot the blood therein and prevent it from flowing out of the atrial appendage. *not disclosed*

118. (New) A method for preventing atrial appendage thrombus from entering the blood stream as in claim 110 further comprising:

providing a means for centering the membrane over the ostium of the atrial appendage to provide a good seal.

119. (New) A method of obstructing an opening in the body of a patient, said method comprising:

minimally invasively inserting a membrane in the opening by use of a catheter to block the opening; and *not disclosed*

securing the membrane in place by the membrane lodging against the opening and providing prongs adjacent an edge of the membrane extending substantially outwardly for attaching the membrane to body tissue on the opposite side of the opening substantially adjacent the opening.

120. (New) A method of obstructing an opening in the body of a patient as in claim 119 wherein the securing comprises:

securing the membrane over an ostium of an atrial appendage.

121. (New) A method of preventing thrombus in the atrial appendage of a patient from entering the blood stream, said method comprising:

providing a filter membrane between the atrial appendage and the atrium;

securing the filter membrane over an ostium of the atrial appendage by extending engagement members substantially outwardly from adjacent an edge of the filter membrane into the atrial appendage through the ostium of the atrial appendage; and

piercing the wall of the atrial appendage with the engagement members extending into the atrial appendage wall substantially adjacent the ostium to secure the filter membrane in place; thereby:

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filtering blood flow to prevent thrombus from flowing out of the atrial appendage.

122. (New) The method as defined in claim 121, wherein the plurality of engagement members is attached adjacent the edge of the filter membrane in a substantially circular configuration, the method further comprising:

centering the filter membrane over the ostium by the engagement members positioning the filter membrane relative to the ostium.

123. (New) The method as defined in claim 121, further comprising:

expanding a cylindrical support member to which the filter membrane and the engagement members are attached, to engage the ostium of the atrial appendage for securing the filter membrane across the ostium.

124. (New) The method as defined in claim 121, further comprising:

attaching the filter membrane and the engagement members to a portion of a collapsible structure;

attaching the filter membrane to the ostium of the atrial appendage by extending the collapsible structure into the ostium and expanding the collapsible structure; such that:

the collapsible structure expands and engages the circumference of the ostium; and

the filter membrane is stretched across the ostium.

125. (New) The method as defined in claim 121, further comprising:

coating the filter membrane with an anticoagulant drug to prevent thrombosis.

126. (New) The method as defined in claim 121, wherein the filter membrane is structured to encourage endothelial cells to grow in the filter membrane thus providing a cell wall over the filter membrane to prevent thrombosis.

127. (New) The method as defined in claim 121, further comprising:

providing a means for centering the filter membrane over the ostium of the atrial appendage to provide a good seal.

128. (New) A method of preventing atrial appendage thrombus from entering the blood stream comprising:

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blocking an atrial appendage ostium with a membrane preventing blood from entering the atrial appendage and forming thrombus therein and preventing thrombus formed therein from leaving; and

injecting a blood coagulating substance into the atrial appendage to clot blood therein and prevent blood from flowing out of the atrial appendage.

not allowed